IDOT HMA Tech Briefs

61st Annual Bituminous Conference

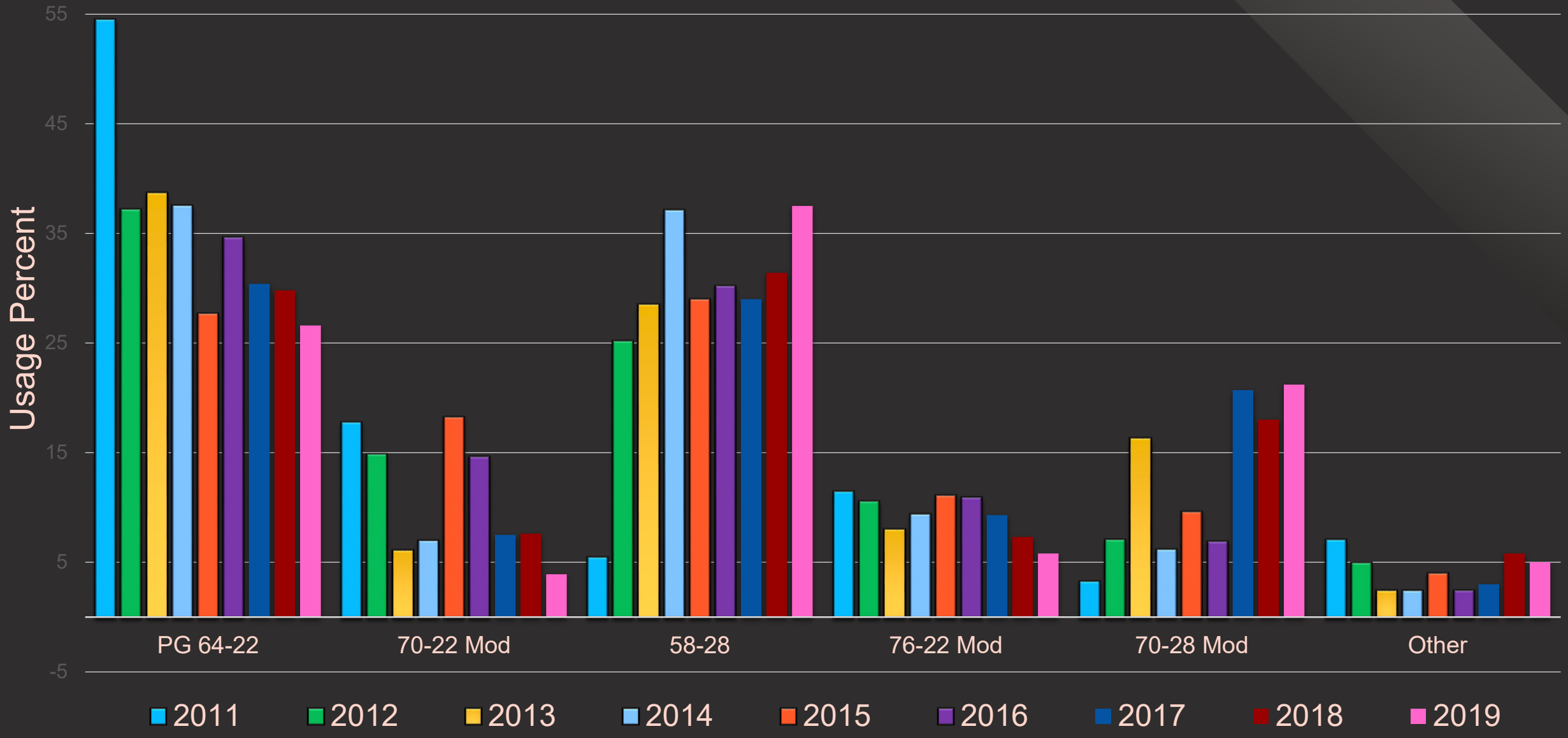
Jim Trepanier
Engineer of HMA, Aggregate & Chemical Tests
Illinois Dept. of Transportation

Illinois Department of Transportation

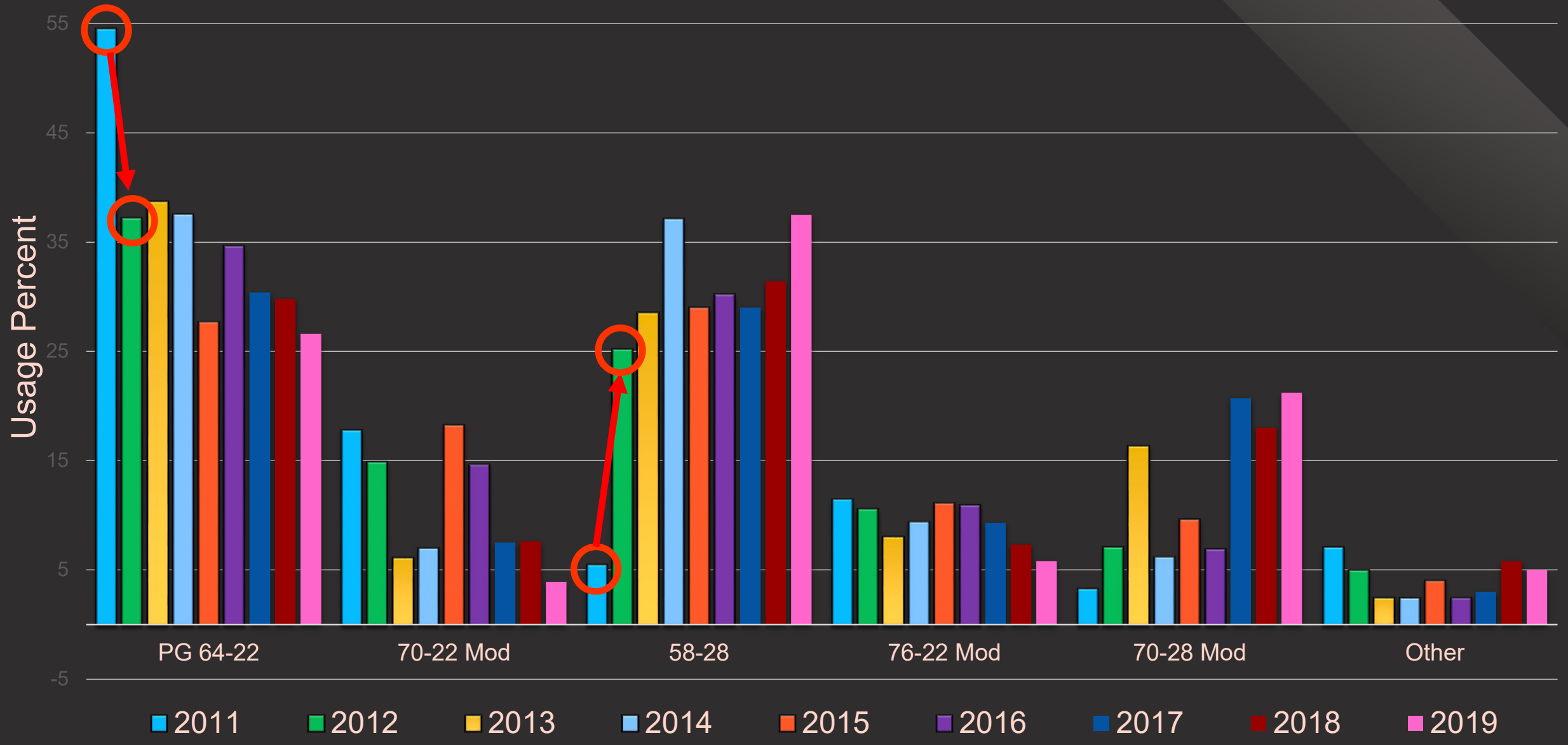
Topics

- Binder Usage & Trends
- HMA & Binder Research
- FLS & FLSWS
- Wax Mod Tack
- I-FIT Implementation
- HMA Specifications
- Miscellaneous Topics

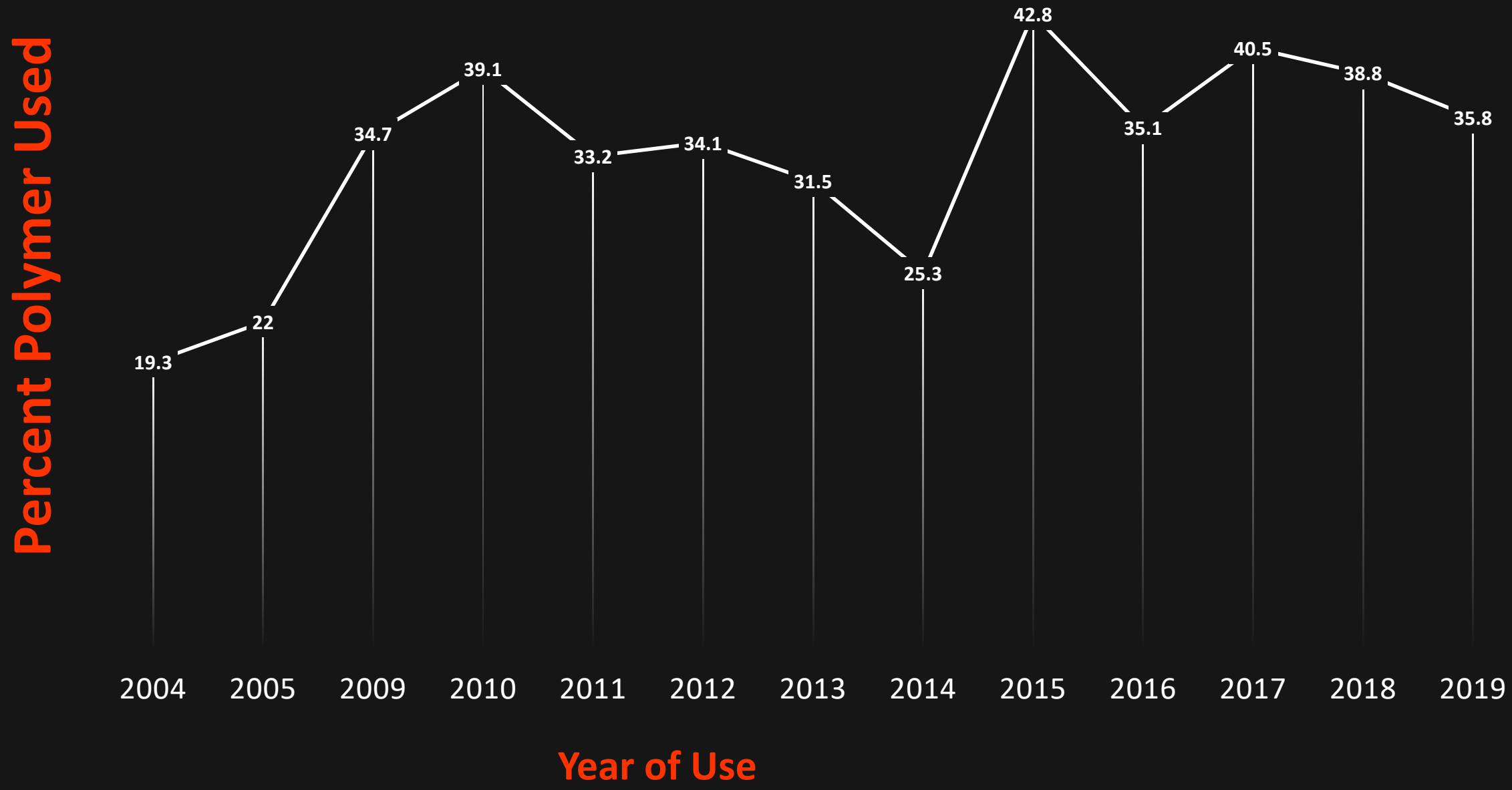
2011 to 2019 Grade Usage



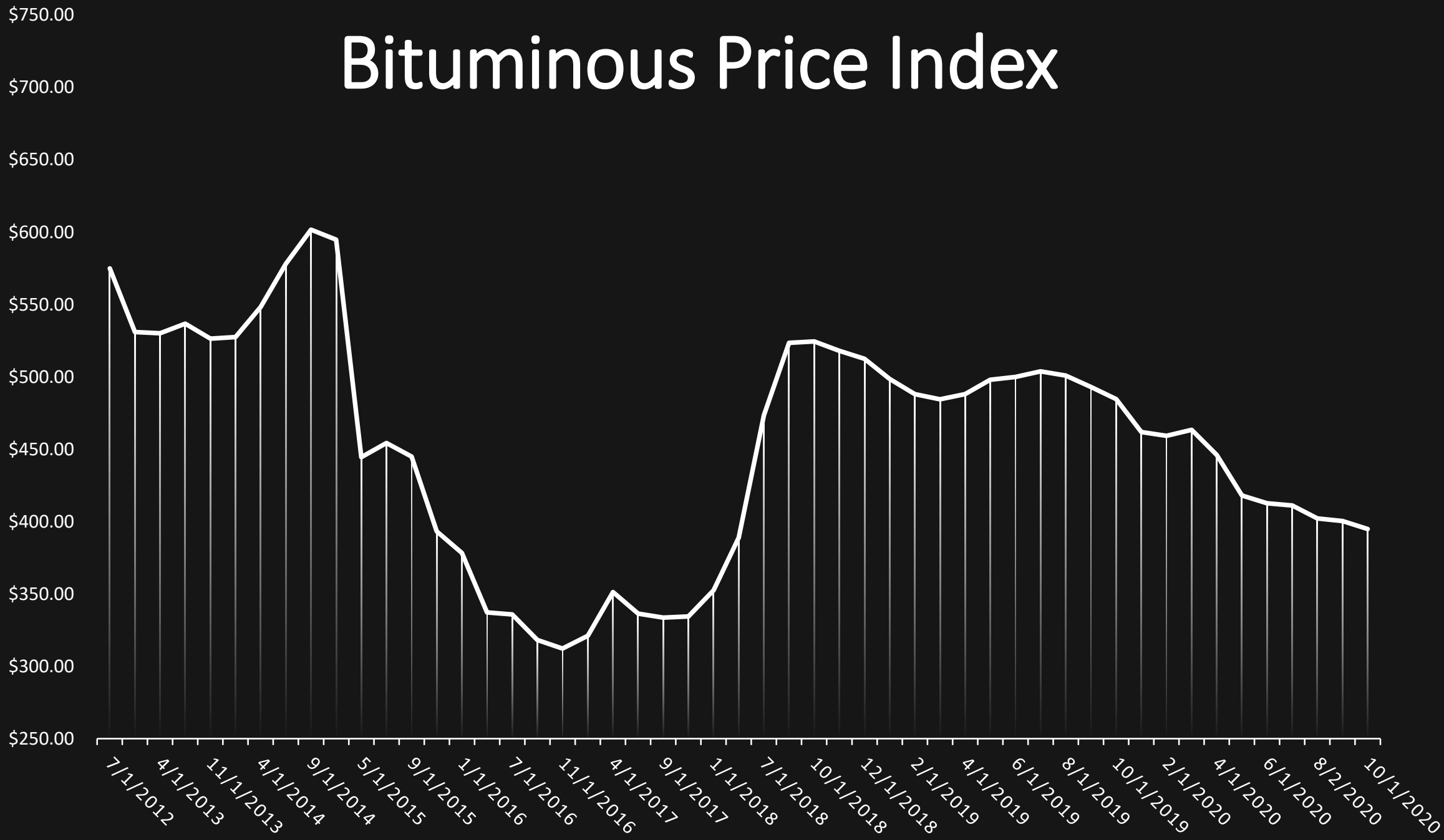
2011 to 2019 Grade Usage



PERCENT POLYMER USED VS. TIME



Bituminous Price Index



Asphalt Binder and HMA Research Timeline

2017

ICT R27-175, Development of LTA Protocol for I-FIT (Completed 8/31/19)

2018

ICT R27-196HS, Rheology-Chemical Based Procedure to Evaluate Additives/Modifiers used in Asphalt Binders (Ongoing)

2019 => 2021

Work continues on R27-196HS.

Delays due to COVID University Labs closed for safety.

2022

IDOT Implements a LTA protocol & spec reqmnts for modified binder qualification based on the R27-175 protocol.

Full Lane Sealant (FLS)

Full Lane Sealant

Two Years Later:

- No visible difference between controls and FLS applications
- All sites are performing well
- Joints treated with LJS are also holding up well

FLS Waterproofing System

- Alternative bridge deck waterproofing system for bridge decks
- Uses FLS and low permeability HMA mixtures that are easier to achieve a higher density with static rolling
- Prevents the ingress of water and chlorides
- More Efficient and cost effective construction

Full Lane Sealant Waterproofing System(FLS)

#1

Tack Coat

0.05 lb./sq. ft.

#2

Full Lane Sealant

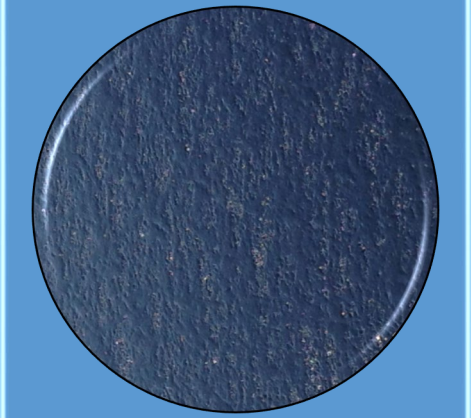
Interlayer

0.25 lb./sq. ft.

#3

HMA IL-4.75

¾ Inches



#4

Full Lane Sealant

Tack

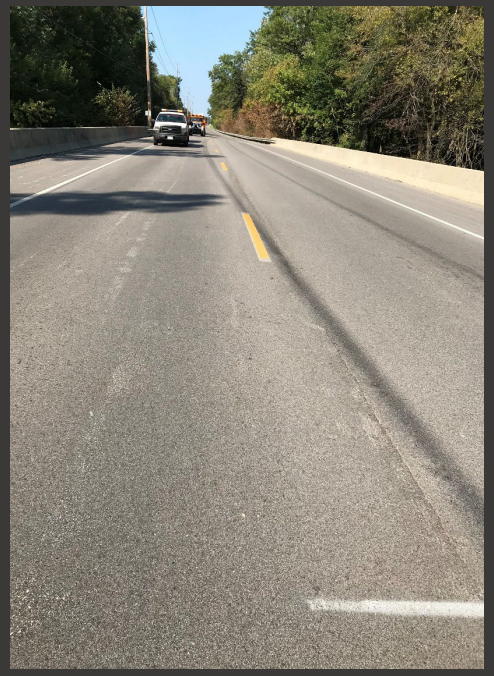
0.15 lb./sq. Ft.

#5

9.5 SMA

1 ½ Inches

FLS Waterproofing
D8 IL 40 Year 2





- The FLS Waterproofing System is working well on all sites applied

- Chloride ingress has been stopped & the pavement surfaces are holding up very well.

Wax-Modified Hot Applied Asphalt Tack Coat (WMT)

- Developed an Experimental Feature Workplan
- Worked with Industry to develop a material specification
- Chemical Test Unit evaluated & characterized the materials
- Districts 4 & 6 applied the material in 2020

District 4 68F24, WMT application
District 6 application was similar

Not Ready for Prime Time - CMB will continue to work with Industry to improve

I-FIT Implementation

Revised Implementation Goals for 2020

- No I-FIT Thresholds on ANY projects this Year
- Districts characterized ALL mixes this year by Performing:
  - As-Produced I-FIT Test on **All** Mixes
  - Long Term Aged I-FIT Testing for **All Surface** Mixes

Revised I-FIT 2021

- Research not far enough along to complete the new Asphalt Binder Performance Testing Suite ∴
  - No Binder Modifiers in 2021
  - No LTA Testing Requirement for Surface Mixes in 2021
- As-Produced I-FIT Testing required for **All** Mixes
- Long Term Aged I-FIT Testing for **All Surface** Mixes
  (For Informational Purposes Only)

I-FIT 2022

- As-Produced I-FIT Testing required for All Mixes
- Asphalt Binder Performance Testing Suite In-Place
  - Begin Allowing Binder Modifiers
- Long Term Aged I-FIT Testing required for All Surface Mixes

Flexibility Index Minimum Requirements

Illinois Modified AASHTO TP 124		
Mixture	Short Term Aged (STA) Minimum FI	Long Term Aged (LTA) Minimum FI
SMA	~~18.0~~ **16.0**	~~12.0~~ **10.0**
IL-4.75	12.0	

HMA Specification Revisions

2022 Spec Book

- QC/QA Revised to meet Federal Regulations
- PFP & QCP added to Section 1030
- 40+ Documents updated for Clarity & Consistency
  - Std Specs, Special Provisions, Policy Memos, Procedures, Des. Manual etc…
- District 1 & Statewide RAP/RAS Special Provision Consolidated & Incorporated into Section 1031

Emergency BDE Special Provisions
January 2021 Letting

- **Consolidated RAP/RAS Special Provision**
  - Statewide & District One RAP/RAS Special Provisions Consolidated
    - Features a blend of the two specifications
    - Vetted through HMA TWG Meeting
    - **Effective January 2021 Letting**
- **I-FIT Special Provision**
  - Long Term Aging Requirements Removed for 2021
  - Relaxed Hamburg Wheel Requirements for IL-4.75

Relaxed Hamburg Wheel for IL-4.75

(1) Hamburg Wheel Test. The maximum allowable rut depth shall be 0.5 in. (12.5 mm). The minimum number of wheel passes at the 0.5 in. (12.5 mm) rut depth criteria shall be based on the high temperature binder grade of the mix as specified in the mix requirements table of the plans.

Illinois Modified AASHTO T 324 Requirements 1/	
PG Grade	Minimum Number of Wheel Passes
PG 58-xx (or lower)	5,000
PG 64-xx	7,500
PG 70-xx	15,000 2/
PG 76-xx (or higher)	20,000 2/

1/ When produced at temperatures of 275 ± 5 °F (135 ± 3 °C) or below, loose warm mix asphalt shall be oven aged at 270 ± 5 °F (132 ± 3 °C) for two hours prior to gyratory compaction of Hamburg wheel specimens.

2/ For IL-4.75 binder course, the minimum number of wheel passes shall be reduced by 5,000.

Miscellaneous Topics

PG Selection Table for Overlays D1 – D6

Type of Pavement	Layer	Illinois N_{design} Number	Design ESALs (million)	PG Binder Grade		
				Traffic Loading Rate		
				Standard	Slow or High ESALs	Standing
Overlay of PCC or Composite Pavement	Surface or Binder	30	≤ 0.3	~~PG58-22~~ PG58-28	~~PG64-22~~ PG58-28	~~PG64-22~~ PG58-28
		50	> 0.3 to 3	~~PG64-22~~ PG58-28	~~SBS PG70-22~~ SBS PG70-28	~~SBS PG76-22~~ SBS PG76-28
		70	> 3 to 10	~~PG64-22~~ PG58-28	~~SBS PG70-22~~ SBS PG70-28	~~SBS PG76-22~~ SBS PG76-28
		90	> 10	~~SBS PG70-22~~ PG70-28	~~SBS PG70-22~~ SBS PG70-28	~~SBS PG76-22~~ SBS PG76-28

I-FIT and Hamburg Air Voids

- Previous Requirements
  - I-FIT and Hamburg Air Void Requirements on Test Specimens
    - 7.0% +/- 1.0%
  - Concerns stated about throwing out too many test specimens
- January 2021 BDE Emergency Special Provision
  - I-FIT and Hamburg Air Void Requirements on Gyratory Bricks
    - 7.5% +/- 0.5%

Lake Land QMP Training

- 2019/2020 Spring Classes were completed Online over the Summer months
- 2020/2021 Training will be Online except for Labs
  - Labs held in-person throughout the week of training by appointment
- 2021/2022 TBD
- Recertification

Lake Land QMP Training

- Recertification:
  - 5 years beginning in 2022
  - Online Review Sessions
  - Online Tests at highest Level but will include questions from Lower Levels
  - 5-Day Aggregate & Level I Techs will have Proficiency Tests
  - Most recent will be lowest Priority (15 or longer, 10-15, 5-10)

Thank You

Jim Trepanier

(217) 782-9607 Work
(217) 622-4790 Mobile
James.Trepanier@illinois.gov

Illinois Dept of, Transportation